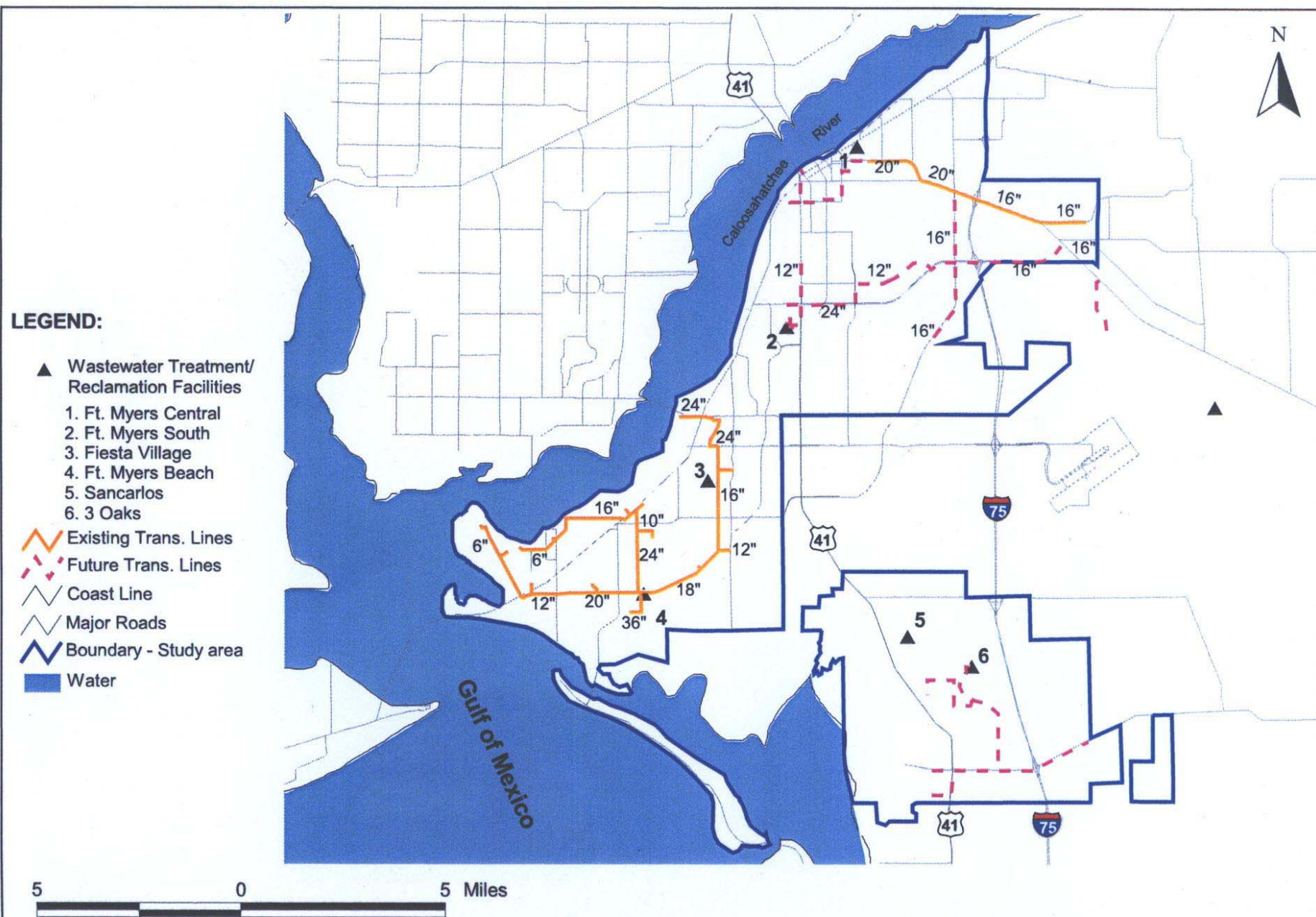# URBAN IRRIGATION WATER DEMANDS

In order to determine the amount of water that will be necessary for future urban irrigation, an evaluation of service area water demands was performed. Significant increases in urban irrigation demands are projected through 2020. In some areas, those sources will not be sufficient to support these future demands. In addition, the seasonality of demands and potential supplies limits the use of some sources. There is 100 percent utilization of reclaimed water supplies in some portions of this project area during the dry months, while there is a surplus during the wet season. It was determined that additional sources of water do exist in the study area to meet a portion of the projected irrigation demands, mainly from surface water and reclaimed water expansions. Storage will be an integral component of this project to span the gap between the seasonal variability of wet weather surpluses and dry season deficits.

Population Projections

First, permanent population projections for each service area were developed from a variety of sources including franchise or utility-supplied data. The majority is based on permanent population and does not reflect seasonal variability. Most of the population projections extended through 2020, but for those that did not, a linear regression was performed using the available data. Table 5 presents an estimate of the current and future population projections and the source of information for each service area.

Table 5
Population Projections

Facility/Service Area	Current Serviced Population 2000	Projected Serviced Population 2020	Source
			Lee County Utilities
Fiesta Village	22,200	39,291	Current determined from monthly flows assuming 100 gpcd, future determined using update to Water Supply Master Plan (2000)
Ft Myers Beach	34,538	48,030	Lee County Planning Community Web Map
Three Oaks	13,484	33,140	Current from the Lee County Planning Community Map, future from the Lower West Coast Water Supply Plan
Gateway	3,020	10,585	Lee County Planning Community Web Map
Lehigh Acres	22,382	91,734	Lee County Planning Community Web Map-utilizing EDUs (from '99 WWTP Permit Modification and Reuse Engineering Report) to determine the population served
Sub-Total	*95,624*	*222,780*	
			Ft Myers Utilities
Ft Myers Central	26,530	36,893	Lee County Planning Community Web Map, taking service area acreage into account
Ft Myers South	47,780	55,764	Lee County Planning Community Web Map, taking service area acreage into account
Sub-Total	*74,310*	*92,657*	
Total	**169,934**	**315,437**	

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LEGEND:

▲ Wastewater Treatment/
Reclamation Facilities

1. Ft. Myers Central
2. Ft. Myers South
3. Fiesta Village
4. Ft. Myers Beach
5. Sancarlos
6. 3 Oaks

Existing Trans. Lines

Future Trans. Lines

Coast Line

Major Roads

Boundary - Study area

Water

Caloosahatchee River

Gulf of Mexico

N

5   0   5   Miles

| Regional Irrigation Distribution System (RIDS) Feasibility Study for the Lower West Coast Region | BOYLE | South Florida Water Management District | SUBREGION 3 - RECLAIMED WATER TRANSMISSION LINES | Figure 3 |

Urban Irrigation Water Demands

The urban irrigation water demands were developed using both actual demand data and the modified Blaney-Criddle (B-C) model as provided by the District. The B-C methodology is explained in Attachment B. Rainfall values in inches per month were generated for the 1-in-10 year drought event, meaning there is a probability of such a drought occurring once every ten years. These values are shown in Table 6.

The following input variables were used to determine the B-C urban irrigation water demands:

- Rainfall Station: Ft Myers
- Irrigation System: Sprinkler
- Crop: Turf Grass
- Irrigable Acreage: Calculated for each service area
- Soil Type: Lee, 0.8 (based on Figures C-8 and C-4 from the Management of Water Use Permitting Information Manual, Vol. III).

Table 6
1-in-10 Year Drought Rainfall Values (inches)

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Lee County	1.3	1.7	0.3	0.7	2.9	7.2	6.8	7.4	8.0	2.4	1.2	1.3	41.2

The irrigable acreage for each service area was estimated based on two main components: developed (residential and to a lesser extent, commercial) areas and open space areas (typically golf courses). Open space areas were determined from utility-supplied data, where possible, and were projected using historical golf course acreages from the Lower West Coast Water Supply Plan (2000), when other information could not be found. Based on experience in Cape Coral and other reuse systems, a factor of 0.075 irrigable acres per capita was used for the developed areas. The results indicated the total irrigable acreage for each service area. On a percentage basis, this amounted to an irrigable acreage per total acreage of approximately 15 to 20 percent, depending on the service area. This is a realistic percentage for a mixed-use area that has a higher residential coverage, but also includes non-developable coverage, which does not require any significant irrigation needs such as wetlands, surface water, and retail/commercial areas. Tables 7 and 8 present the irrigable acreage used to determine the service area irrigation demands.

Table 7
Irrigable Acreage – Current

Facility Inventory	Total Acreage	Developed Irrigable Acreage	Open Space Irrigable Acreage	Total Irrigable Acreage
Fiesta Village	9,781	1,665	272	1,937
Ft Myers Beach	12,954	3,338	360	3,748
Three Oaks	22,363	1,011	625	1,636
Gateway	6,905	227	191	418
Ft Myers Central	13,212	1,990	368	2,357
Ft Myers South	19,069	3,584	537	4,120
Lehigh Acres	*62,672*	*1,679*	*1750*	*3,429*
Total	**146,956**	**13,494**	**4,103**	**17,645**

Table 8
Irrigable Acreage – Future

Facility Inventory	Total Acreage	Developed Irrigable Acreage	Open Space Irrigable Acreage	Total Irrigable Acreage
Fiesta Village	9,781	2,947	272	3,219
Ft Myers Beach	12,954	4,711	360	5,072
Three Oaks	22,363	2,486	625	3,111
Gateway	15,942	794	414	1,208
Ft Myers Central	13,212	2,767	368	3,135
Ft Myers South	31,302	4,182	810	4,992
Lehigh Acres	62,672	6,880	1,750	8,630
Total	**168,226**	**24,767**	**4,599**	**29,367**

It was determined that the B-C method alone does not realistically predict the irrigation demand, especially in terms of a normal temporal distribution in southwest Florida. With heavy local rainfall and an elevated water table, the demand for irrigation water typically decreases during the wet season months. The temporal distribution of the monthly irrigation requirements generated by the B-C model contradict these facts. For this reason, an alternative method was developed for determining irrigation demands for this project. Reuse factors (ratio of monthly reuse demand to annual average reuse demand) were determined for each service area using the flow data supplied by each franchise. For certain service areas that did not show an appropriate distribution, factors from another representative service area were used. These factors were then applied to the annual supplemental irrigation volume supplied by the B-C model as summarized in the table above to create future demand projections. The reuse factors are included in the methodology for Attachment B.

The demand analysis was determined on a temporal basis for each service area. Table 9 presents actual monthly demands for the service area. Figures 4 and 5 present the demands geographically. In Table 9 the current average demand for the study area is approximately 6.8 MGD. Table 10 shows the maximum potential demand based on current irrigable acreages as determined by the Blaney-Criddle model. Table 11 shows the 2020 demand based on the corresponding demands for the future service areas. Taking into consideration the anticipated growth in the region, this estimate appears to be reasonable.

Table 9
Actual Reclaimed Water Use – Current

Facility	Actual Reclaimed System Demand* (MGD)												Annual Average (MGD)	Annual Total (MGY)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec		
Fiesta Village[a]	1.0	1.3	1.1	1.2	1.2	0.6	0.4	0.4	0.2	0.9	1.3	1.0	0.9	321.5
Ft. Myers Beach[a]	2.1	1.9	3.6	3.6	2.8	2.1	2.0	2.0	1.2	2.6	2.8	2.1	2.4	874.8
Ft. Myers Central[b]	0.6	0.7	0.8	0.8	0.8	0.7	0.7	0.7	0.6	0.7	0.7	0.6	0.7	250.6
Ft. Myers South[b]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Three Oaks[c]	1.3	1.1	1.1	1.1	1.1	0.7	1.4	1.6	1.4	1.7	1.8	1.7	1.3	490.0
Gateway	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	109.5
Lehigh Acres	0.9	0.8	0.8	0.8	0.6	0.8	1.1	1.7	2.4	2.0	1.2	1.2	1.2	435.0
Total	**6.3**	**5.9**	**7.7**	**7.7**	**6.8**	**5.2**	**6.0**	**6.6**	**6.1**	**8.2**	**8.1**	**7.0**	**6.8**	**2,481.4**

*"Reclaimed System" is defined as all water that is conveyed in the reclaimed infrastructure, including surface water, reclaimed water, and groundwater
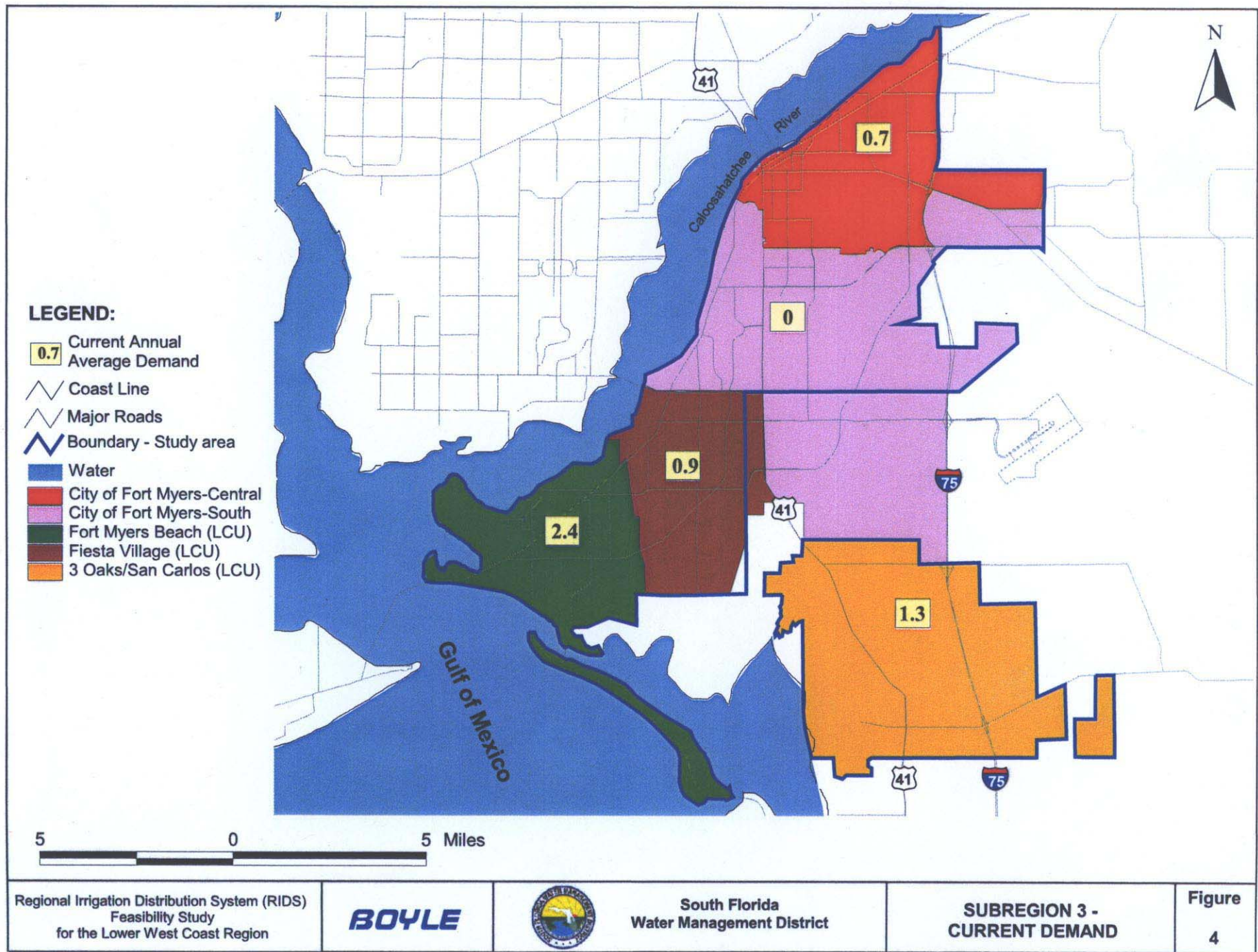a. 2000 data
b. This data displays 2000 data from Oct. - Dec. and 2001 flows for Jan. - Sept.
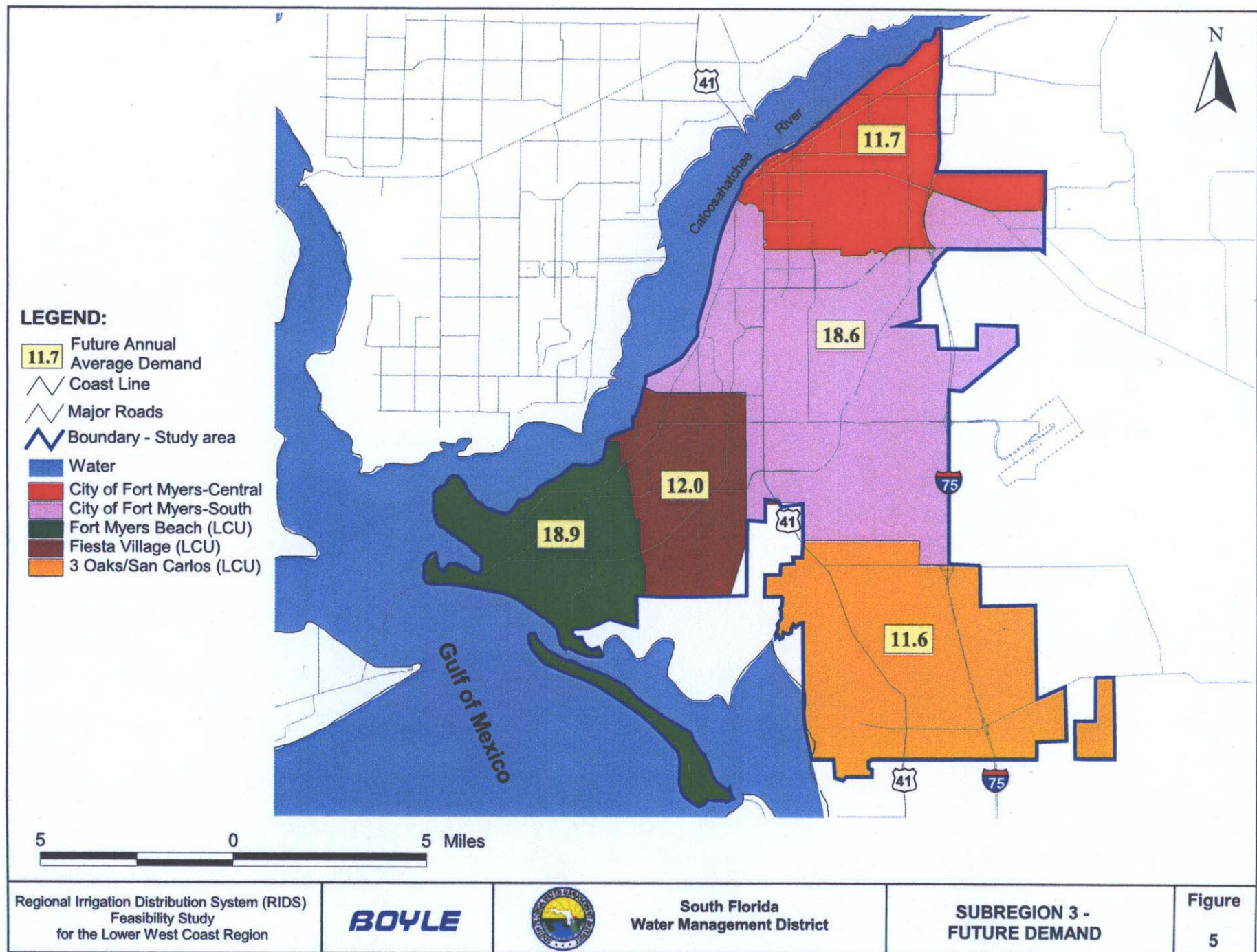c. This data was taken from the 2003 Monthly Operating Reports, submitted to the DEP

Table 10
Maximum Potential Demand – Current

Facility	Current Maximum Potential Demand (MGD)												Annual Average (MGD)	Annual Total (MGY)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Fiesta Village	6.8	6.9	9.5	9.6	8.4	6.3	5.9	5.8	4.2	7.6	8.6	6.9	7.2	2,633
Ft. Myers Beach	13.2	13.3	18.4	18.6	16.2	12.3	11.4	11.2	8.2	14.7	16.6	13.4	14.0	5,095
Ft. Myers Central	8.3	8.4	11.6	11.7	10.2	7.7	7.2	7.1	5.1	9.3	10.4	8.4	8.8	3,205
Ft. Myers South	14.5	14.7	20.2	20.4	17.8	13.5	12.5	12.4	9.0	16.2	18.3	14.7	15.3	5,601
Three Oaks	5.8	5.8	8.0	8.1	7.1	5.4	5.0	4.9	3.6	6.4	7.3	5.8	6.1	2,224
Total	**48.6**	**49.1**	**67.7**	**68.4**	**59.6**	**45.1**	**42.0**	**41.4**	**30.0**	**54.2**	**61.1**	**49.2**	**51.4**	**18,758.6**

LEGEND:

0.7	Current Annual Average Demand
/\/	Coast Line
/\/	Major Roads
/\/	Boundary - Study area
■	Water
■	City of Fort Myers-Central
■	City of Fort Myers-South
■	Fort Myers Beach (LCU)
■	Fiesta Village (LCU)
■	3 Oaks/San Carlos (LCU)

Caloosahatchee River

Gulf of Mexico

5   0   5   Miles

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SUBREGION 3 -
CURRENT DEMAND

Figure

4

LEGEND:

11.7 — Future Annual Average Demand
Coast Line
Major Roads
Boundary - Study area
Water
City of Fort Myers-Central
City of Fort Myers-South
Fort Myers Beach (LCU)
Fiesta Village (LCU)
3 Oaks/San Carlos (LCU)

Caloosahatchee River

Gulf of Mexico

11.7
18.6
12.0
18.9
11.6

N

5   0   5   Miles

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Table 11
Demand Analysis – Year 2020

Facility	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Annual Average (MGD)	Annual Total (MGY)
	Normalized Modified Blaney-Criddle Demand (MGD)													
Fiesta Village	11.7	12.4	14.6	14.8	13.7	10.7	9.8	9.7	7.9	12.5	14.1	12.0	11.98	4,373.9
Ft. Myers Beach	18.5	19.5	23.0	23.3	21.5	16.8	15.5	15.3	12.5	19.6	22.1	18.9	18.88	6,891.5
Ft. Myers Central	11.4	12.1	14.2	14.4	13.3	10.4	9.6	9.4	7.7	12.1	13.7	11.7	11.67	4,259.4
Ft. Myers South	18.2	19.2	22.6	22.9	21.2	16.6	15.2	15.0	12.3	19.3	21.8	18.6	18.59	6,783.7
Three Oaks	11.3	12.0	14.1	14.3	13.2	10.3	9.5	9.4	7.7	12.0	13.6	11.6	11.58	4,226.7
Gateway	4.4	4.7	5.5	5.5	5.1	4.0	3.7	3.6	3.0	4.7	5.3	4.5	4.50	1,641.4
Lehigh Acres	31.5	33.3	39.1	39.6	36.7	28.6	26.3	26.0	21.3	33.4	37.7	32.2	32.13	11,726.4
Total	**107.1**	**113.1**	**133.0**	**134.7**	**124.7**	**97.5**	**89.6**	**88.4**	**72.5**	**113.6**	**128.2**	**109.5**	**109.3**	**39,896.0**

 * These figures represent calculated values for the year 2020, based on a normalized version of a modified Blaney-Criddle Method.

The demands estimated above were larger than predicted by the Water Supply Plan. It is clear a variety of alternative sources will be necessary to satisfy these projected irrigation demands and to minimize impacts to other stretched resources, such as groundwater.

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